

ABSTRACT OF THE DISCLOSURE

A carbon fiber woven fabric for use as a gas diffusion layer base material in a polymer electrolyte fuel cell has a surface that is smoothed and further optimized to inhibit non-uniform infiltration of a coating for water-repellent-layer formation, to provide an electrolyte membrane-electrode assembly suitable for operation under a high humidification condition. The gas diffusion layer base material may be a carbon fiber woven fabric, wherein a ratio of the area of gap portions where neither warp thread nor weft thread exists: $(10/W-Y)(10/Z-X)$ to the area of portions where warp thread is crossing weft thread: $XY \text{ mm}^2$ is in the range of about 1/1500 to about 1/5, where the carbon fiber woven fabric has a warp density of Z threads/cm, a weft density of W threads/cm, a warp thickness of X mm and a weft thickness of Y mm.